

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.-6. (Canceled)

7. (Currently Amended) A laser irradiation method comprising the steps of:
shaping a first laser beam having a wavelength not longer than that of visible
light into an elongated beam on a surface to be irradiated irradiated, wherein said laser
beam is a harmonic wave of a solid laser; and

irradiating the surface with the elongated beam wherein an irradiation area of the
elongated beam has at least a first portion and a second portion, said first portion
having a lower energy density than the second portion;

irradiating the surface with a second laser beam concurrently with the elongated
[[beam]] beam, said second laser beam having a fundamental wave emitted from a solid
laser, in such a manner that an irradiation area of the second laser beam overlaps at
least the first portion of the irradiation area of the elongated beam while moving the
surface relatively to the elongated beam and the second laser beam in a first direction.

8. (Currently Amended) A laser irradiation method comprising the steps of:
shaping a first laser beam having a wavelength not longer than that of visible
light into an elongated beam on a surface to be irradiated irradiated, wherein said laser
beam is a harmonic wave of a solid laser;

irradiating the surface with the elongated beam wherein an irradiation area of the
elongated beam on the surface has at least a first portion and a second portion, said
first portion having a lower energy density than said second portion;

irradiating the surface with a second laser beam emitted from a solid laser concurrently with the elongated beam wherein an irradiation area of the second laser beam on the surface has at least a first portion and a second portion having a higher energy density than the first portion, said second laser beam having a fundamental wave,

wherein the irradiation of the elongated beam and the second laser beam is performed in such a manner that the second portion of the irradiation area of the second laser beam overlaps at least the first portion of the irradiation area of the elongated beam while moving the surface relatively to the elongated beam and the second laser beam in a first direction.

9. (Canceled)

10. (Currently Amended) A laser irradiation method according to claim 7 or 8, wherein each of the first laser beam and the second laser beam is emitted from an Ar laser, a Kr laser, a CO₂ laser, one selected from the group consisting of a YAG laser, a YVO₄ laser, a YLF laser, a YAlO₃ laser, an alexandrite laser, a Ti: Sapphire laser, and a helium-cadmium laser and a Ti: Sapphire laser.

11. (Original) A laser irradiation method according to claim 7 or 8, wherein the surface to be irradiated is a film formed over a substrate transparent to the first laser beam having a thickness d, and wherein an incidence angle Φ of the first laser beam to the surface to be irradiated satisfies an inequality $\Phi \geq \arctan (W/2d)$, when a major axis of the elongated beam or a minor axis of the elongated beam is assumed to have a length of W.

12. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a non-single crystalline semiconductor film over a substrate;
shaping a first laser beam emitted from a first laser oscillator into an elongated beam on a surface to be irradiated wherein the first laser beam has a wavelength not longer than that of visible [[light]] light, wherein said laser beam is a harmonic wave of a solid laser;

irradiating the non-single crystalline semiconductor film with the elongated beam wherein an irradiation area of the elongated beam has at least a first portion and a second portion, said first portion having a lower energy density than the second portion portion, wherein a portion of the non-single crystalline semiconductor film irradiated with the first laser beam is melted;

irradiating at least said portion of the non-single crystalline semiconductor film with a second laser beam emitted from a second laser oscillator, said second laser beam having a fundamental wave emitted from a solid laser, wherein the irradiation of said portion of the non-single crystalline semiconductor film with the second laser beam is performed concurrently with the irradiation of the elongated beam in such a manner that when said portion is in a molten state due to the irradiation of said first laser beam, and an irradiation area of the second laser beam overlaps at least the first portion of the irradiation area of the elongated beam; and

moving the substrate relatively to the elongated beam and the second laser beam in a first direction, thereby, forming a crystal grain region in the non-single crystalline semiconductor film; and

moving the substrate in a second direction relatively to the elongated beam and the second laser beam.

13. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a non-single crystalline semiconductor film over a substrate,

shaping a first laser beam emitted from a first laser oscillator into an elongated beam on a surface to be irradiated wherein the first laser beam has a wavelength not longer than that of visible [[light]] light, wherein said laser beam is a harmonic wave of a solid laser;

irradiating the non-single crystalline semiconductor film with the elongated beam wherein an irradiation area of the elongated beam has at least a first portion and a second portion, said first portion having a lower energy density than the second portion portion, wherein a portion of the non-single crystalline semiconductor film irradiated with the first laser beam is melted;

irradiating at least said portion of the non-single crystalline semiconductor film with a second laser beam emitted from a second laser oscillator ~~outputting a fundamental wave oscillator, said second laser beam having a fundamental wave emitted from a solid laser,~~ wherein an irradiation area of the second laser beam has at least a first portion and a second portion, said second portion having a higher energy density than the first portion;

forming a crystal grain region while moving the substrate in a first direction relatively to the elongated beam and the second laser beam;

moving the substrate in a second direction relatively to the elongated beam and the second laser beam,

wherein the irradiation of said portion of the non-single crystalline semiconductor film with the second laser beam is performed when said portion is in a molten state due to the irradiation of said first laser beam and the irradiation of the elongated beam and the second laser beam is performed in such a manner that the second portion of the irradiation area of the second laser beam overlaps at least the first portion of the irradiation area of the elongated laser beam.

15. (Currently Amended) A method of manufacturing a semiconductor device according to claim 12 or 13,

wherein each of the first laser oscillator and the second laser oscillator is selected from the group consisting of ~~an Ar laser, a Kr laser, a CO₂ laser, a YAG laser, a YVO₄ laser, a YLF laser, a YAlO₃ laser, an alexandrite laser, a Ti: Sapphire laser, and a helium-cadmium laser~~ laser and a Ti: Sapphire laser.

16. (Original) A method of manufacturing a semiconductor device according to claim 12 or 13,

wherein the first direction and the second direction are orthogonal to each other.

17. (Original) A method of manufacturing a semiconductor device according to claim 12 or 13,

wherein the substrate is transparent to the first laser beam and has a thickness d, and

wherein an incidence angle Φ of the first laser beam to the surface to be irradiated satisfies an inequality $\Phi \geq \arctan (W/2d)$, when a major axis of the elongated beam or a minor axis of the elongated beam is assumed to have a length of W.

18. (New) A method of manufacturing a semiconductor device comprising the steps of:

forming a non-single crystalline semiconductor film over a substrate;
irradiating the non-single crystalline semiconductor film with a first laser beam emitted from a first laser oscillator, said first laser beam is a harmonic wave of a solid laser and said first laser beam has a wavelength not longer than that of visible light, wherein a portion of the non-single crystalline semiconductor film irradiated by the first laser beam is melted;

irradiating the non-single crystalline semiconductor film with a second laser beam emitted from a second laser oscillator, said second laser beam having a fundamental wave emitted from a solid laser wherein the irradiation of the second laser beam is performed in a molten state of the non-single crystalline semiconductor film by the first laser beam;

moving the substrate relatively to the first laser beam and the second laser beam, thereby, forming a crystal grain region in the non-single crystalline semiconductor film.

19. (New) A method of manufacturing a semiconductor device comprising the steps of:

forming a non-single crystalline semiconductor film over a substrate;

irradiating the non-single crystalline semiconductor film with a first laser beam emitted from a first laser oscillator, said first laser beam is a harmonic wave of a solid laser and said first laser beam has a wavelength not longer than that of visible light, wherein a portion of the non-single crystalline semiconductor film irradiated by the first laser beam is melted;

irradiating the non-single crystalline semiconductor film with a second laser beam emitted from a second laser oscillator, said second laser beam having a fundamental wave emitted from a solid laser wherein said second laser beam is selectively absorbed in a molten state of the non-single crystalline semiconductor film by the first laser beam;

moving the substrate relatively to the first laser beam and the second laser beam, thereby, forming a crystal grain region in the non-single crystalline semiconductor film.

20. (New) A method of manufacturing a semiconductor device according to claim 18 or 19,

wherein each of the first laser oscillator and the second laser oscillator is selected from the group consisting of a YAG laser, a YVO₄ laser, a YLF laser, a YAlO₃ laser, an alexandrite laser and a Ti: Sapphire laser.

21. (New) A method of manufacturing a semiconductor device according to claim 18 or 19,

wherein the substrate is transparent to the first laser beam and has a thickness d, and

wherein an incidence angle Φ of the first laser beam to the surface to be irradiated satisfies an inequality $\Phi \geq \arctan (W/2d)$, when a major axis of the first laser beam or a minor axis of the first laser beam is assumed to have a length of W.